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Sites of translation in digital reporting

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Abstract

Purpose – This study analyses the process by which 'analogue' corporate reports produced under a 'paper paradigm' are translated into a machine language as required by digital reporting. The paper uses Austin and Searle's linguistic speech act theory to examine how digitally translating reporting information into atomised data affects the infrastructure and practice of accounting.

Design/methodology/approach – Extensive interview and observation evidence focussed on the IFRS Foundation's digital reporting project is analysed. An interpretive approach is informed by the concepts of L compatibility, illocution and perlocutionary acts which are drawn from speech act theory.

Findings – Two key sites of translation are identified. The first site concerns the translation of accounting standards, principles, and practices into taxonomies for digital tagging. Controversies arise over the definition of accounting concepts in a site populated by accounting and IT-orientated experts. The second site of translation is in the routine production and dissemination of digital reports which impacts the L compatibility between preparers and users.

Originality/value – The paper highlights a previously unexplored field of translation in accounting and contributes a unique perspective that demonstrates that machine translation is no longer marginalised but is the 'primary' text with effects on the infrastructure and practice of accounting. It extends speech act theory by applying it to the digital domain and in the context of translation between languages.

Keywords - digital reporting, translation, L compatibility, illocutionary analysis, taxonomies, machine language, corporate reporting

Paper type - Research paper

1. Introduction

This paper highlights the importance of the translation process required to convert paper-based corporate reports into digital corporate reports. We use seminal work in the philosophy of linguistic communication (Austin, 1961; Bach & Harnish, 1979; Cooren, 2000; Searle, 1989) to reveal the impact of digital translation on accounting standards and reporting. We show that the 'translation' of corporate reporting information into digital data for online accessibility and automated processing is a 'manipulative activity' (Bassnett and Trivedi, 1999, p. 2) that spans technological boundaries and epistemic cultures (Knorr Cetina, 1999). In doing so, we provide evidence that counters the assertion that digital reporting is simply a different media and that the translation process is a 'mechanical' one in which the message remains the same (Hoogervorst, 2012).

Electronic and digital reporting are not the same, although the terms are often used synonymously. Electronic reporting includes any transmission of reports online. Digital reporting enables the translation of data at the individual item level into a format that can be recognised by computers to enable searching and automated processing (Hoffman and Rodriguez, 2013). The view that digitisation of corporate reporting data 'create[s] an unambiguous way to identify and compare business performance of one company to another' (Liu *et al.*, 2017, p. 43) has been largely uncontested.

While the growth in the number of companies providing digital corporate reports was slow up until the US SEC's adoption mandate in 2009, their availability is increasing at a significant rate internationally. Regulators in the UK, China, Singapore, Germany, Israel, Australia, the Netherlands and many other jurisdictions now require the submission of digital filings (SEC, 2009; Singerová, 2015; Srivastava and Kogan, 2010). Most recently the European Securities and Markets Authority has regulated for the mandatory application of digital reporting across the European Union by 2020 (ESMA, 2016). It is possible that digital reports will be the only media required for the regulated communication of corporate financial and non-financial information in the near future.

The adoption of digital reporting is said to improve and 'democratise' the accessibility and comparability of corporate reporting information thereby facilitating the free flow of capital (Liu *et al.*, 2017; Yoon *et al.*, 2011). The digitisation of accounting data also contributes to the analytic possibilities offered by 'big data' (Al-Htaybat and von Alberti-Alhtaybat, 2017; Bhimani and Willcocks, 2014; Roth, 2009). However, Lowe *et al.* (2012) argue that much of the benefit of digital reporting flows to the regulators that mandate its adoption so that they can automate the process of monitoring and surveillance. Furthermore, no attention has been paid to the conditions under which digital data provides effective communication for this or other purposes.

The IFRS Foundation is an active participant in the development of the technologies required for digital reporting that are part of the infrastructure for accounting standard-setting and corporate reporting. The work of creating digital standards for the transmission of accounting data is a boundary activity that involves both accountants and IT experts. Increasingly, it is an important part of the *production* process by which reports are collectively constructed and the *consumption* process whereby such accounts travel to, and are used by, different audiences, including regulators and analysts (Liu *et al.*, 2017; Ramin and Reiman, 2013).

Our focus in this paper is on the largely overlooked aspect of 'interlingual' translation between the context-dependent, sequential presentation of 'traditional' accounting statements and the syntactic and semantic requirements of digital reporting. We argue that there is not the expected 'one-to-one semantic correspondence of concepts between different language-cultures' (Baskerville and Evans, 2011, p. 9) in the case of the translation of accounting into digital reporting artifacts '… especially … when a subject or discipline – such as accounting – is culture-specific, socially constructed, inherently indeterminate or ideological' (Evans and Kamla, 2016, p.1). We argue that 'messy collective endeavours' (Robson *et al.*, 2017, p. 37) are involved and that the organisational 'work' of (digital) translation (Kettunen, 2017) should be studied to identify the implications for corporate reporting participants (Debreceny *et al.*, 2009; Roohani *et al.*, 2009).

The empirical setting for the research is the IFRS Foundation's long-term project to develop the technology necessary to allow IFRS-based corporate reports to be created and communicated in a digital format. The perspectives extend to the US and Europe as the snowballing of participants in the IFRS digital reporting project led to interviews with people involved in similar projects. The analysis is based on one of the researcher's advisory role in the project, 32 interviews conducted between 2012 and 2015, and documentary evidence.

We contribute to the literature by showing how the translation of accounting standards and reports into their digital expressions is impacting the syntax and semantics of communication between the preparers and users of corporate reports. We also explore the boundary work involved in developing digital reporting technologies between the IT specialists and accounting standard-setters. We extend widely-used theories about locution and the performativity of accounting text as speech acts into the digital reporting domain (Austin, 1961; Bach and Harnish, 1979; Cooren, 2000; Searle, 1989; Van Peursem *et al.*, 2005).

The next section provides a background to the translation process involved in creating digital reports. Section 3 introduces the linguistic theory of L compatibility (Austin, 1961; Cooren, 2000; Searle and Vanderveken, 1985) and its application to corporate reporting. The methodology and empirical data is discussed in section 4. The data analysis is presented as two sites of translation in the next two sections. The discussion and conclusion sections complete the paper.

2. Digital reporting – translation and structured data

Companies have been providing annual reports electronically using different approaches for almost as long as the internet, or more particularly, the World Wide Web has been available. The most common format adopted is Portable Document Format (PDF) (Beattie and Pratt, 2003; Xiao *et al.*, 2002). The popularity of PDF derives from the confidence it provides that the recipient receives the corporate report just as it was intended by the preparer. The same content is on the same pages of the document and formatting, layout and colours are preserved. The widespread use of PDF is a testament to the value placed on its reliable replication of the characteristics of a paper document. Although the information is transmitted by machine translation to zeroes and ones (the 'digits' in digital), it does so in a way that preserves the analogue characteristics of a paper document (ICAEW, 2004).

To capitalise on the digital recording, transmission and processing of corporate reports, data must be released from the constraints of the paper-based, analogue view. Data may be

'released' in a completely unstructured way, such as entering corporate reporting disclosures onto a web page. Unstructured data on the internet (in HTML pages) can be searched and easily accessed but the search engine will not be able to associate a meaning with reporting numbers or text. No distinction would be made between Apple Sales (the IT company) and apple sales (the fruit), nor (accounting) Goodwill and (benevolent) goodwill. This results in such an overload of responses that the data sought is just as inaccessible as if it is 'locked' in a PDF document (Debreceny and Gray, 2001; Locke *et al.*, 2010).

The solution for delivering the benefits of digital accessibility of reported company data and effective searching, is to structure the data by adding 'meta-data' tags. Each reported item has an electronic tag attached that is linked to a dictionary (called a taxonomy) that contains data about the data item – that is, meta-data (Gartner, 2016; Hüner *et al.*, 2011). In the example of goodwill, the number would be associated with a tag that specifies contextual accounting information and a definition of goodwill. The context information includes other data required to interpret an item from an annual report, such as the period (end date or duration), the company identifier, the currency, the relevant accounting standard, the 'denomination' (millions, thousands, etc), and whether or not it is a ratio. Rather than searching for the label given to a data item which may vary from one company to another (goodwill, amortised goodwill, purchased goodwill) it is possible to search for the meta-data tag to ensure that all such reporting disclosures are captured regardless of the way they are named by particular companies.

The tag enables users to search for subsets of data from a cross-section of companies, and automatically locate and process them for analysis without reference to any of the other data included in the corporate report. For example, with the right software, it is possible to search for the intangible assets and goodwill of the top ten technology companies on the Nasdaq for a specified period and have the data returned into an analysis tool almost instantaneously (Debreceny and Gray, 2001; Ramin and Reiman, 2013).

During the process of translation, the 'analogue' paper-based view of corporate reports is 'atomised' into individual, digital data items that are accessible as structured data. Nevertheless, regulators focused on improved data accessibility have emphasised that the accounting standards, methods, and narrative of accounting remains the same: digital reporting is 'just' a different medium that has little to no impact on the meaning and message of corporate reports (Hoogervorst, 2012).

Figure 1 shows the first page of an annual report filed in the US as 'raw' digital data, unfiltered by an intermediary application. The 'atomised' data may be flexibly presented or re-presented in many different ways only one of which may be what the preparers of the report intended. The stark differences between paper-based (PDF) and digital reporting mean that there are places – or 'sites' – of translation between them that need to be analysed and understood.

Figure 1 First screen of 'raw' Microsoft Corp Instance Document filed 28-07-2016

Source: https://www.sec.gov/Archives/edgar/data/789019/000119312516662209/0001193125-16-662209-index.htm

In this paper we provide evidence that the translation from a paper-based, analogue format to a digital one has significant impacts on the infrastructure and process of corporate reporting, accounting standard-setting and the communication of corporate information. Translation is considered here in the sense of 'the rendering of a source-language text into the target-language' (Kettunen, 2017, p.38). Digital reports are assumed to materialise on the internet without translation – an act similar to the digitisation of a picture into pixels, so that it can be very accurately rendered back into the picture that was originally taken. However, accounting is a socially constructed practice where meaning is mediated by culture, context, and the communication medium (Evans, 2004; Evans *et al.*, 2015). In this case, accounting concepts are translated into a language that can be understood and processed by computers. An information technology language, that is foreign to most accountants, preparers and users of accounting reports must be used to express the source text as the target, digital report.

The belief that the translation process involves a one-to-one correspondence that provides accurate digital reproductions of 'traditional', paper-based accounting reports masks the translation work and wider, infrastructure impacts of this developing communication medium. It ignores the radical role of translation into digital reports as a 'primary activity' rather than a 'marginal' one (Bassnett and Trivedi, 1999, p. 3).

In the next section we outline a theoretical approach to understanding the 'highly manipulative activity that involves all kinds of stages in that process of transfer across' (Bassnett and Trivedi 1999, p.2) technological and epistemic boundaries (Knorr Cetina, 1999).

3. A model of L compatibility

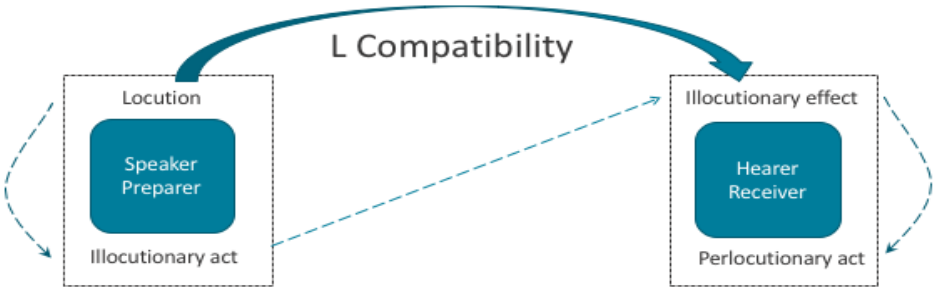
The purpose of translation is to enable concepts developed in a source language to be communicated to speakers in a target language. To theorise our analysis of the translation of traditional, analogue reports into a digital language, we use the theory of locution, widely

applied in the philosophy of language (Bach and Harnish, 1979; Cooren, 2000; Searle and Vanderveken, 1985).

The premise is that the 'speech acts' whether verbal or recorded, are performed by a speaker with an intention to communicate. The communication is *felicitous* if it is expressed using effective syntax and words that are relevant and clear in the social context (Bach and Harnish, 1979, p. 5). If the use of the language is defective or the utterance is ambiguous, the speech act is *infelicitous* and is unlikely to be understood in the way it was intended (Bach and Harnish, 1979, 1992; Vanderveken, 1990). The act of conveying meaning is the *locution* of the utterance. L compatibility is achieved when the locution is felicitous (Vanderveken and Kubo, 2001).

A speech act may go beyond locution to have *force* in which case it has illocutionary intent (Bach & Harnish, 1992; Searle & Vanderveken, 1985; Vanderveken, 1990). Under certain conditions, it may be performative where the hearer's beliefs and/or actions are affected. If so, the utterance becomes a perlocutionary act (Austin, 1961; Searle & Vanderveken, 1985). For example, if the CEO of a company announces an earnings downgrade, s(he) is revising a statement that may have been treated as a 'promise' by investors. If an investor recognises the utterance as having an *intent* to change their beliefs, then that is sufficient to make it an illocutionary act regardless of whether they consequently change their beliefs. Should they revise their beliefs and actions as a result of the announcement, it is a perlocutionary act (see the Appendix for a summary of key terms). This model is depicted in Figure 2 that adapts Van Peursem *et al*.'s (2005) locutionary analysis.

Figure 2 A Model of L Compatibility



Source: adapted from Van Peursem *et al*. (2005, p.118).

The intentionality of corporate reporting has been widely highlighted in prior literature. For example, Davison (2011) argues that '(t)he annual report is a powerful instrument of organizational communication, rich in content and image construction' (p. 118). Stanton and Stanton (2002) identify that the purpose of annual reports is to 'proactively construct a particular visibility and meaning' (p. 478) and other authors emphasise annual reports as texts appropriate for linguistic analysis (Campbell and Slack, 2008; Macintosh and Baker, 2002; Quattrone, 2009). Quattrone (2016) argues further that '... accounting …can prepare the ground for communicative actions which will lead to decisions' (p.118) echoing the perlocutionary potential of accounts.

Corporate reports as a tool of communication can be used to obfuscate and mislead (Cho *et al.*, 2012; Leung *et al.*, 2015). A stream of research in corporate social responsibility

reporting explores this theme and identifies how management intentionally attempts to influence the user's perception of the company (Cho *et al.*, 2015; Cho *et al.*, 2010; Neu *et al.*, 1998). This work emphasises that even though the message may not have integrity or be truthful, it is nonetheless formed with an intention to communicate.

Nevertheless, Cooren (2000) provides an interpretation of this framework that removes the need to interpret the speech act as only linked to the intention of the speaker and the understanding of the hearer. A speech act may be analysed from 'the speaker's (or writer's), the hearer's (or reader's), or even the witness' perspective' (p.5). Cooren (2000) adopts the view that speech acts may be effective across time and space – that they are *transcontextual* (p.4). He draws on Derrida's (1988) construction of the materiality of speech acts:

> Every speech act is ultimately based on a mark, a trace produced by an agent. This mark … has a material dimension that is inescapable: it is the speaker's breath, the ink marks left on the paper by the *scriptor*, the gesture performed by the actor. (Cooren, 2000, p. 36, emphasis in the original)

This is important for interpreting text as speech acts since they may be recorded as printed text, digitised, or spoken and still retain their effectiveness (Cooren, 2000, p. 4). Corporate reporting is a complex activity that involves many people, including accountants, investor relations consultants, auditors, CEOs and Board members (Davison, 2011). Cooren's (2000) perspective that the intention of the speaker is not the essential starting point for analysis is useful. The text is treated as transcontextual and embodying an intention that is subject to the reader's interpretation. The hearer's role in interpreting the speech act is not a passive response to the illocutionary act. They may refuse to take the trouble to understand it, ignore it, or otherwise use it as they choose in the social setting (Van Peursem *et al*., 2005).

We adopt the view that accounting reports, accounting standards and digital taxonomies are texts (Macintosh and Baker, 2002) that are assemblages of speech acts which may, in the right circumstances, possess illocutionary force (Austin, 1961; Searle, 1989; Van Peursem *et al.*, 2005). Where speech acts possess legitimacy, they may be performative in that they have the authority to bring something, an action, object or event, into being with the participation of the hearer (Didier, 2007; Searle and Vanderveken, 1985). Cooren (2000) argues that text may act as 'machines … on behalf of the speaker' (p.3). In our setting, the machines are generated by an assemblage of other texts – accounting standards, taxonomies and reports – texts upon texts (Bassnett and Trivedi, 1999, p.3) changing the shape of institutions, organisations, business and capital flows internationally.

The model of L compatibility provides an analytical framework within which to explore the composition and transmission of corporate reports in a structured data format, to highlight the role of translation on communication. Our focus is to frame our empirical analysis to identify the key places in the process of translation from traditional 'analogue' accounting into digital reporting language and explore how translation may affect the efficacy of communication. We wish to explore not only what may be lost in the process of translation, but also what may be gained (Bassnett and Trivedi, 1999). We also contribute to the theory by extending its application to translation in a digital setting which emphasises the infrastructure required for conditions of felicity in digital communication.

4. Methodology

The study is based on an interpretive analysis of the experience of participants and the researchers as observers, in the project to enable the translation of corporate reports into digital data. The interviews are focussed on the IFRS Foundation's digital technology project. In the period from 2012 to 2015 we interviewed 31[1] participants including those involved with the creation of the taxonomy, standard-setters, professional body experts and preparers of digital reports[2] (see Table 1). The table identifies the interviewees in broad categories to protect their identities in line with the confidentiality agreement. Because the number of people actively involved in the project is small, they may be identifiable. To support the reader's understanding of the perspective of the interviewee in direct quotes, a general description of their role is provided.

Interviewees were selected purposively through networks of contacts and interviewee referrals. The interviewees were provided with a plain language statement and gave their informed consent for the audio recording of the interview. Twenty-three interviews were conducted over a period of three months in 2015, three in 2013 and six in 2012. The earlier interviews and researcher participation as an advisor to the IFRS project provided the base understanding that informed the later interviews and gave a sense of the trajectory of the translation project. The interviews were semi-structured and almost all were attended by two researchers. A small number of interviews were conducted by Skype, but most were held face-to-face in the offices of the interviewees. All interviews were transcribed and analysed in NVivo using themes drawn from speech act theory. The average length of an interview was an hour.

Table 1 Interviewees

Category	Number of interviewees
Technical experts	6
IFRS Foundation • Standard-setters • Taxonomy developers • International Accounting Standards Board (IASB)	15
Other stakeholders • National standard-setter/regulator • Preparers of annual reports • Professional accounting body • Software consultant • Data aggregator/investor relations	11

The IFRS Foundation has a long-established team for translating its standards into digital taxonomies and as the dominant accounting standard-setter internationally, it is an appropriate and important setting for the research. The US also has well-established expertise in digital reporting and through the close links with participants in the IFRS project, we were able to gain insights into the US project and reporting outcomes.

The analysis of the interview data, observation and documents through the lens of L-compatibility highlighted two main sites of translation in the production of digital reports.

[1] One interviewee was interviewed twice – so there were 32 interviews.

[2] The conditions for the collection and use of data from human subjects were approved by the Ethics Committee of the Open University (UK).

The first is the translation of the body of accounting knowledge and standards into the infrastructure of tools required for digital report generation. The second site of translation is the regular production of digital reports for consumption by analysts, investors, regulators or other users. The two sites are discussed in the following two sections, after which the policy and practical implications are discussed in the context of current literature.

5 Tools for digital report generation

5.1 Introduction

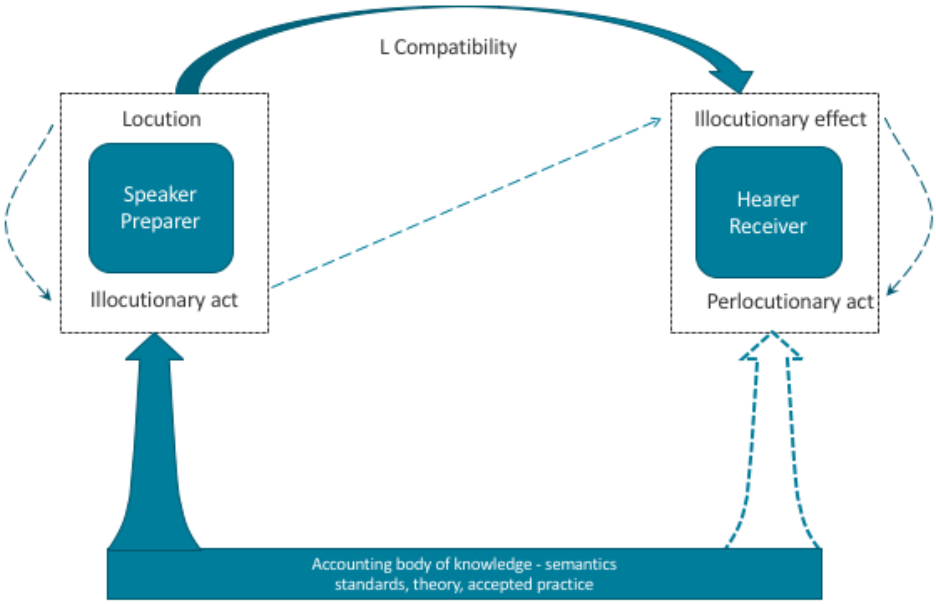
Communication cannot occur in a vacuum, it relies on lexicons and understandings about semantics and syntax that can be formalised for implementation. The foundation for the work of communicating accounting information is comprised of elements such as the double entry accounting model that dates back to Pacioli which in turn underpins the concept of a 'balance sheet', the changes in which are reflected in an 'income statement' (Bebbington *et al.*, 2001; Macintosh, 2002; Sangster, 2018). This basic structure provides the syntax of 'debits,' 'credits' and 'balances'. Accounting is a dynamic language which has been layered with historical, political and contextual interpretations that are reflected in theories, accounting standards, guidance and interpretations which specify how complex concepts (e.g., deferred tax, goodwill, impairment) should be derived and applied. Accounting concepts are also created and interpreted in practice, with localised usages and 'dialects' (Morgan, 1988; O'Dwyer, 2005).

Producing general purpose corporate reports involves the combined efforts of people with technical backgrounds in communications, marketing, investor relations, and sustainability as well as accounting (Davison, 2011). The technical language of accounting is, however, likely to be the most significant barrier to users' ability to understand corporate reports and so the underpinning accounting concepts are an essential element in achieving L compatibility.

Accounting knowledge is an important part of the 'salient contextual information' a user of accounts relies on to understand what is s(he) is intended to infer from a corporate report (Bach and Harnish, 1979, p. 5). Figure 3 adds to the model of L compatibility in Figure 2 to reflect the source of understanding for the social and technical setting of accounting as a language for a specific purpose (Evans *et al.*, 2015). The rendering of the events relevant to a reporting entity into accounting language requires fluency with the jargon, concepts and relations of accounting. It is expected that the receiver of the communication will undertake some effort to understand this body of knowledge. The IFRS Foundation's Conceptual Framework specifies:

> Financial reports are prepared for users who have a reasonable knowledge of business and economic activities and who review and analyse the information diligently. At times, even well-informed and diligent users may need to seek the aid of an adviser to understand information about complex economic phenomena. (IFRS Foundation, 2010, QC32)

Figure 3 Model of L compatibility in accounting

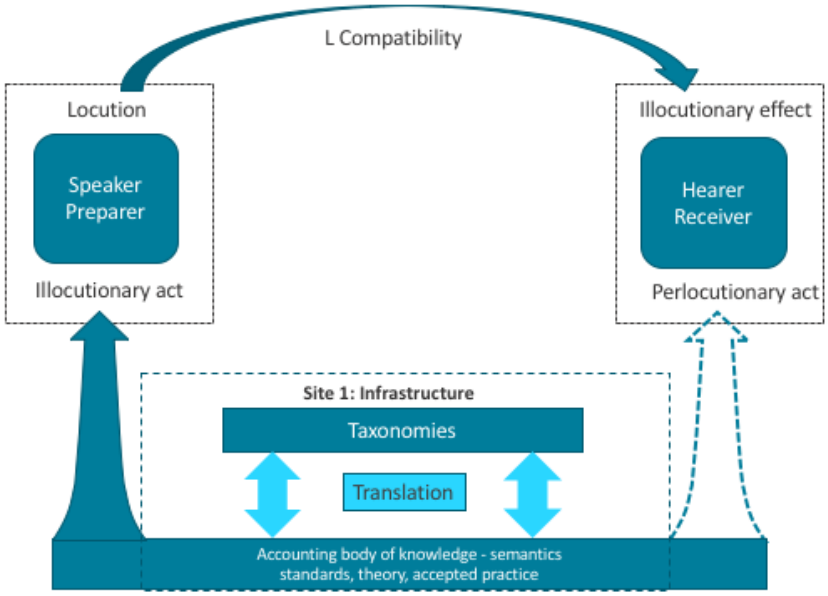


While the accounting body of knowledge is available to receivers of accounting reports, L compatibility is possibly already in jeopardy because '(s)ome phenomena are inherently complex and cannot be made easy to understand' (IFRS Foundation, 2010, p. QC31), particularly for non-professional users. Figure 3 reflects this weaker connection to the technical concepts and language of accounting by making the connecting arrow less well defined.

It was into this, already ambiguous, context for communication that the development of digital reports emerged. Rather than starting *de novo*, the narrative that digital reporting is just another medium for the transmission of corporate reports meant that the work undertaken was to re-create the analogue perspective in digital form, that is, to *translate* the existing accounting concepts into machine language.

A key tool for the generation of digital reports is a taxonomy, which is translated from the body of knowledge into a digital grammar as shown in Figure 4. The taxonomy defines a multitude of financial and non-financial corporate reporting elements and places them in a hierarchical structure which also specifies other characteristics such as debit or credit (Piechocki *et al.*, 2009; White, 2006). The taxonomy thereby codifies accounting concepts and disclosures in a format that will allow digital tags to be attached to data in corporate reports. The taxonomy is an important element in the digital reporting infrastructure.

Figure 4 Tools for digital translation in accounting



The grammar most widely used in corporate reporting during the IFRS Foundation's digital reporting project was eXtensible Business Reporting Language (XBRL) (Hoffman, 2006; Xiao *et al.*, 2002). For the purpose of identifying the sites of translation for digital reporting, it does not matter which grammar is used to structure data for automated processing by computers. They are all grammars with a technical basis in information technology (IT) and the internet. The translation work requires fluency in the language of accounting and the IT grammar deployed to tag the data. In this site two different epistemic cultures must co-ordinate to fabricate a coherent expression of accounting concepts for the digital medium.

The next two subsections report on the process of translation in the infrastructure of digital reporting and its effects on accounting standards.

5.2 Translating accounting into digital taxonomies

A taxonomy contains the standardised information about each reporting element that is attached to a digital data item. Creating and maintaining one with sufficient depth and detail for reporting entities to use is a significant undertaking. A taxonomy developer at the IFRS reflected on the work involved:

> ... and these guys were in charge of developing the first … prototype taxonomies in 2005, 2006 and the process [and] the workflow, they were really raw, and they had to implement some alternative processes to make it smooth[er] because … apparently it took four, up to five people six months to develop the … materials for the taxonomy and that was really challenging because it's a lot of work involved in this and it was actually manual work. (Taxonomy developer, interview, 2015)

A taxonomy is often explained by comparison with a dictionary as it contains information about each data element that allows software to interpret it. However, another metaphor often used is that the tags are similar to barcodes, so the taxonomy is like an index of barcodes that

links the scanned digits to the agreed UPC-A product (Boeri, 2007). The important point that this metaphor highlights is that while speakers of a language may be able to 'make do' without a dictionary and cope if words that are no longer commonly used are omitted, the scanned barcode is meaningless without reference to the index of products.

The impact of this in our context is that the taxonomy that is referenced by a tagged report (instance document) must be openly available to any receiver of the report and that exact taxonomy must remain available for as long as that report is going to be accessible. Just as in the situation that when a product code is removed from the UPC-A index the barcode is meaningless, so if an accounting taxonomy is updated for changes in a standard or accounting practice that changes the definition of a concept or removes a treatment that is no longer permitted, the earlier taxonomy must remain available otherwise all previous reports that reference the earlier taxonomy cannot be identified or interpreted. The tagged data is available on the internet but essentially 'lost to sight'.

The technical support to identify a version was identified by one of the original IFRS taxonomy team members as important:

> … we asked that the versioning specification be the most important priority of the (XBRL) consortium … because we needed to be able to version the taxonomy and communicate to people what had changed.... (Interview, 2015)

Some of the processes and technical tools were developed in-house at the IFRS Foundation:

> …there was really a breakthrough when we … developed our own in-house tailored software to manage … and archive taxonomies, test quality assurance of the IFRS taxonomy every time we publish something... (IFRS taxonomy team member, Interview 2015).

Fundamental differences in the development of the IFRS taxonomy and the US GAAP taxonomy became a significant issue over time. The US taxonomy was started earlier and relied on older grammatical constructions of the underlying data standard (XBRL) for dealing with tables and started from the premise that its purpose was to capture accounting reporting practice.

The IFRS Foundation's Taxonomy team was instructed to work only from the IFRS standards[3]. The outcome was two very different taxonomies. The US one was comprehensive (approximately15,000 elements) and included a detailed definition of each element. The IFRS taxonomy included only concepts from the standards (approximately 2,000 elements) and provided references to the standards rather than definitions.

> …but just the fact that International Accounting Standards and US GAAP cannot agree on a structure, a concept, it means that any time that I integrate a new taxonomy, [whether I am] tool making [or] being a user of these data, I cannot do that because the interpretation of these taxonomies are different, and the data definitions are not correct. (Reporting consultant interview, 2013)

[3] When the project started the standards were IASs (International Accounting Standards) and the Foundation was known as the International Accounting Standards Committee. For simplicity, we use a single set of names for the bodies and the standards.

The differences became a matter of concern when the US SEC mandated structured digital data documents for submission and then later as a full filing (SEC, 2009). The SEC refused to approve the IFRS taxonomy for use by foreign filers. While not publicly stated, participants in our interviews believed that it did not meet 'usability' requirements because preparers of reports did not have a comprehensive enough set of tags and the taxonomy was not self-contained with definitions. It was also a stumbling block for convergence of reporting and the hope that IFRS could become an option for all companies reporting to the SEC to reduce compliance costs. The taxonomy differences presented an obstacle to the adoption of IFRS in the US and prompted a compromise position in which the IFRS taxonomy was expanded beyond the concepts in the standards (to over 5,500 elements) and included definitions so that after seven years the US SEC approved it for use (SEC, 2017).

A standard-setter knowledgeable about taxonomy development observed in an interview in 2015 that:

> …the definitions … drove me nuts, because if we hadn't defined it in accounting I don't know how some computer guy could come along and give it a definition…

There are many issues embedded in the different philosophies for the development of the taxonomies. How many concepts are sufficient? What is the boundary between having so many that it is difficult to find the right one, having all preparers of accounts use it in a consistent way, and not having enough? How should the concepts be defined and by whom? In particular, in the context of digital reporting, what is the role of professionals with expertise in IT rather than accounting?

One thing that emerges clearly as a view from those involved from both the standard-setting and taxonomy development perspectives, is that the translation of accounting knowledge into digital taxonomies and tools involves extensive work and is not a 'mechanical' process. It is influenced by different attitudes to reporting and regulation, historical context and requires a combination of expertise.

The next section considers how translating accounting standards and practice into a taxonomy may affect the accounting standards and practices that form generally accepted accounting principles (GAAP).

5.3 Taxonomies and accounting knowledge – reflexive translation

In the previous section, the different choices and institutional settings for taxonomy development between the US and the IFRS create a context for political tensions between the standard-setting body and regulators. In this section, we consider the relationship between the syntax and other 'grammatical' requirements of computer-based languages for the internet.

The inability of current computer systems to interpret subtleties, or contextual differences imposes on the promulgators of accounting standards a greater requirement for conceptual clarity. Reliance on the professional understanding and judgement of an accountant to interpret the meaning and context of an accounting standard is no longer sufficient. The computer is essentially 'dumb' and must be told exactly the definition and context of a data item. That definition must be precise, consistent, and distinct from other accounting definitions and should include all the required contextual information. A standard-setter closely associated with taxonomy design we interviewed in 2015 explained:

> They [the taxonomy developers] are identifying … any inconsistencies in language where … [in] any kind of structured data capture … you're writing computer code then it's ones and zeros. You have to be very specific and when you look at the words and go 'I have no idea what those words mean' then [the taxonomy developers] go back and ask [the standard-setters] what they mean and if they can't explain what they meant then they have to change the words or clarify.

Rather than the text necessarily being 'diminished and rendered inferior … there may also be a process of gain' (Bassnett and Trivedi, 1999, p. 4). The site of translation of the taxonomy is an opportunity for heteroglossic voices (Macintosh and Baker, 2002) to engage in a dialogue as the computer grammar contributes different perspectives on 'fabricating' accounting standards (Chua, 1995).

Despite the lack of understanding early in the IFRS Foundation's taxonomy development program, by 2015 both the standard-setters involved in drafting IFRS and taxonomy team members saw the value in the translation process:

> Oh yeah! …[Taxonomy Team member] is really good and [s(he)] picked things up and I looked at some of the stuff and asked questions 'why is this discretionary, should this be like this and should this be like that' and [s(he)] asked questions of 'why have you said this, why have you said that' because [s(he)] came at it from an IT processing point of view and I came at it from a standards setting point of view so between us that did definitely add value… (IFRS standard-setting team member, interview 2015).

> I really can see no negative impact … I can't imagine that [taxonomy translation] would be problematic to … the standards. The positive part I see is … that in some cases it can help clarify a given disclosure that is required by the standard-setting group. …[S]ometimes they write a disclosure and I would look at it and go 'I can't tell if they are asking for that disclosure to be as of December 31st or for the year ended December 31st because I am trying to create a tag for it and I don't know if it is an instant or a duration … [The] taxonomy actually adds value in that case to the standards setting which is something that nobody considered would be the case. (IFRS taxonomy developer, interview, 2015)

The taxonomy team also has a concern with the usability of the taxonomy, that is, it must be comprehensive enough to be useful. So, the process of translation also highlights areas in which there is need for further development in the accounting standards:

> …so [in the taxonomy] we've either picked up exactly the accounting definition or we've given a very bland description, but it's actually highlighted something really important because there are some that you would look at and go 'you know what the standards team should actually come along and do that …' so for example …what's financing costs? Does it include the discount unwind for remedial work for … the environment, when you have to fix the environment when the factory closes or something? It's not defined, … so that's … an example of 'it shouldn't be up to the taxonomy guys to define', … it's up to the standard-setters to define and the taxonomy guys tell us where there are inconsistencies or

> gaps because … they are capturing [the accounting standards]. (IFRS senior accounting standard-setter interview, 2015)

The discipline of the computer grammar means that the teams working on the taxonomy have an overview of the use of concepts across all the standards, their definition and how they have been classified in the taxonomy structure. They need to answer very detailed questions about each concept element to create the entry for it in the taxonomy. Consequently, the need for translation is not passive, it triggers conversations and even changes in the drafting of standards. The due process and organisational arrangements at the IASB have moved from complete isolation of the taxonomy developers to an increasing integration of the technical standards and taxonomy teams to encourage this dialogue and improve the quality of both the taxonomy and the standards (IFRS Foundation, 2015; Teixeira, 2013a, 2013b).

The definitions are also sites of controversy in translation where concepts and their legitimacy for inclusion in taxonomies are debated. A preparer of annual reports for a large multinational company strongly asserted that there should not be an element 'other assets':

> There ***are no*** 'other assets'. There are either 'other financial assets' or 'other non-financial assets' but no 'other assets'. (Preparer interview, 2015)

This type of discussion and debate is not restricted to major standard-setters such as the IFRS Foundation and the FASB in the US. Companies and other regulatory bodies seek to create taxonomies to permit structured data communication internally. Examples of these projects are more easily observed in the public sector and include projects such as reporting to the European Central Bank (COREP and FINREP), the Australian Prudential Regulatory Authority in Australia and the FDIC in the US. There is no *a priori* reason why the same benefits of improved accuracy, and transparency could not be achieved by companies and organisations, particularly those that lack an integrated internal reporting system (Garbellotto, 2009b; OECD, 2009). The process of creating dialogue to clarify the vocabulary of discourse could not only reduce the reporting burden on government regulated entities by reducing the number of related, similar items of data they are required to report to government but also result in improved communication within and among government departments. There are a number of fieldwork sites in Australia, the Netherlands and the UK where a study of the processes and outcomes of this dialogue (or lack of it) could provide useful research outputs and early studies are reporting interesting results (Troshani and Lymer, 2010).

This section has explored taxonomy translation as a site for research into the translation of accounting standards and practice into the digital grammar used for taxonomy creation. The next section focuses on the translation required each time a company reports and identifies areas of potential impact that Austin and Searle's theories of linguistic communication highlight for accounting.

6 Digital reporting as a site of translation

6.1 Introduction

The previous section explored how the extant body of knowledge in accounting may form a shared technical lexicon between a preparer of accounts (the speaker) and the receiver of those accounts, often referred to as a 'user' (Young, 2006) or in the case of Searle's theory, the hearer. The model of L compatibility raises the issue of whether the preparer of accounts or the regulator have an intention to communicate. In Section 3 it was argued that one of the purposes of annual reports is to communicate a message despite them being 'generally the creation of a collective anonymity of accountants, auditors, lawyers, marketing specialists, environmental experts and graphical designers' (Davison, 2011, p. 124). Our interviewees support this view:

> Users need to be able to compare one company to another company, but [preparers] also need to tell their own story, what their strategies are and how they've executed on their strategies…. I think the communication needs to be job one… (Chief Accountant, US Top 50 company, interview 2012).

> … the disclosure initiative is highlighting the work on streamlining and New Zealand and Australia is saying 'tell us what's important' you know, people do want you to tell a story and then they also want … to see your story and have the data... (IFRS senior standard-setter, interview 2015).

> … what I would like to see is much more, a de-emphasis on compliance, I know I am a standard-setter but, actually much more focus on communication and communicating about what's important and sort of telling it in a real way… (UK standard-setter, interview 2015).

The illocutionary framework also raises questions about how the users of corporate reports understand or interpret them. If preparers put in effort to convey a message as if it may be understood, an important question is how users receive and interpret it.

The L compatibility framework is a useful way of organising the contributions of such research and highlights how little is known about what users understand from corporate reports. Studying the understanding of users is problematic because it is often assumed that the meaning of the complex tenets and outputs of accounting is shared. This may perhaps be all that is possible because all participants are acting 'as if' they understand because meaning is not observable[4].

Our focus is on identifying the potential impact of digital translation on L compatibility and therefore the illocutionary force and perlocutionary acts stimulated by the communication. The next part of this section describes the site of translation from preparer systems into digital reports. This is followed by two sections that focus first on what may be gained or lost in the machine language translation undertaken by the preparer and then on the user's perspective of digital reports.

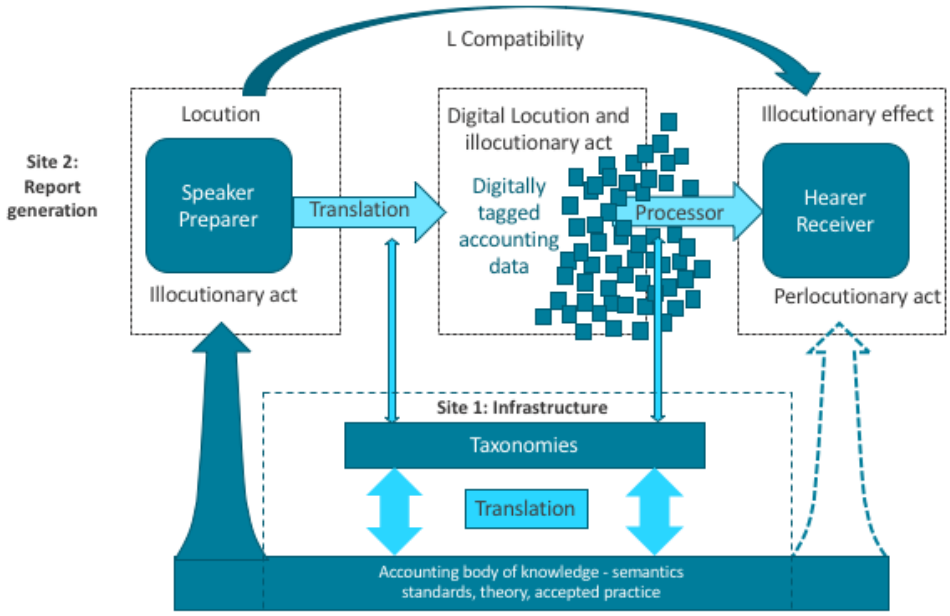
[4] The authors are grateful to one of our anonymous reviewers for this insight.

6.2 L compatibility model of digital report translation

Our interviews and observation of the process of digital reporting has identified a two-stage process of translation between the preparer and user. This site of translation includes the preparer's process of translating their account into the machine language and then the user's action through computer software to extract selected data and re-constitute it into a human readable form.

Figure 5 reflects this by interposing the 'digital locution and illocutionary act' between the preparer of accounts and the user to show the additional translation process and its potential effects on the act of communication. The atomisation of data is represented by showing the report broken into separate data items (pixelated) that are accessible in whatever configuration the user prefers.

Figure 5 L Compatibility model of digital translation



6.2.1 Preparer translation

On the left-hand side of the diagram, the preparer(s) of accounts translate the text of the report from the traditional analogue report format into the structured, tagged format of digital reporting. This step involves using the taxonomy as a data dictionary to apply a tag which in the preparer's judgement best approximates the intended meaning. This translation process is needed every time a digital report is prepared.

The translation may be an additional process undertaken after the reports are largely finalised, it can be moved back earlier in the report preparation stages, or it could even be largely automated[5]. Our respondents indicated that not many companies have automated the process. Their descriptions of the process highlighted the interaction with the taxonomy and its effect beyond the digital reports. A senior executive in a large international financial

[5] The practice of adding the digital tags after the reports are completed has been called a 'bolt on' approach (Garbellotto, 2009a). A number of our interviewees consider this term to be disparaging and lacking in nuance, so we refrain from using it here.

services company based in the US reflects on using a taxonomy to tag a financial report in preparation for its digital dissemination:

> …when you're searching for a tag or looking through it, if you go into let's say Debt, and [that's] the area you want to go into. So, first you click Debt and secondly you click maybe a certain part of it to get a certain area, within two or four clicks in either of the taxonomies [US GAAP or IFRS] you are down to the five tags or so that you need to choose from…the key is when someone creates [a new tag] to try and … tie it to something else. For example, if it's in a calculation, even though it's [a new tag], … it still relates to something. It's part of current assets for example because you can see the calculation rolls down to that so … that's important. (US preparer and taxonomy developer, interviewed 2015)

The detailed work of identifying the right tag may only need to be done when there is a new disclosure item or the taxonomy changes after the initial tagging. It is clear how painstaking the process is to find the right tag and to ensure the relationships in the report are preserved in line with the constructs in the taxonomy.

The taxonomy also offers a short-cut checklist that some preparers see as an advantage of the process of translation to digital reporting:

> … coming back to one of my previous roles, they had a technical team …[of] two or three technical accountants and they [had] to sit there and read through the standards, identify what was required by the standard so when year end came, and auditors went through the books then we complied with everything according to the standards. Having a taxonomy now is making that job a lot easier, because all the disclosure requirements are there and in addition to that the references are there so rather than having to troll through a whole series of pages to understand what is required of you, you can simply go to the reference and it might be a paragraph or a couple of pages, … and it reduces the amount of time it would take you to prepare you whole set of accounts. (Accountant and taxonomy developer, interviewed 2015)

Further to this, the taxonomy may be used as a guide for required disclosures that also facilitates tagging:

> So the first step was, really, not to look at the technology itself but simply to look at the financial statements and then ask ourselves, 'what do we need to change in the financial statements to make the tagging process easier?' (Chief accountant, large European company, interviewed 2013)

The experience of the accuracy and quality of translation into digital reports has not been good:

> … there are still errors in the [digital] US GAAP filings. I don't think they have improved over the last few years, I think it improved in 2009, 10, 11, 12 as people learned more and understood it more... but in the last few years there has not been improvement. There has got to be some initiative that, bring[s] the hammer down and says it needs to improve...and I think it will get there once the SEC enforces it more. That's all it would take. (US preparer and taxonomy developer, interviewed 2015)

This is partly because of the 'soft' implementation in the US that initially did not treat the digital report as part of the legal filing even though it was required (Debreceny *et al.*, 2010; SEC, 2009). Many of the errors were a result of preparers not understanding that the normal balance rules of debits and credits were built into the taxonomy – so they added a negative or positive sign where it was not needed, which meant that balance sheets did not balance (Boritz and No, 2008; Debreceny *et al.*, 2010). Another common error was the failure to select the right tag (Du *et al.*, 2013). For example, in the cash flow statement companies may report the change in cash balance excluding the impact of foreign exchange. Some companies incorrectly used the data tag, 'CashAndCashEquivalentsPeriodIncreaseDecrease' rather than the more precise, 'CashAndCashEquivalentsPeriodIncreaseDecreaseExcludingExchangeRateEffect'[6]. This type of problem arises where preparers are not familiar enough with the taxonomy and select an element that is descriptive of the item without realising there is a better tag. These errors lead to a loss of comparability between corporate reports and the potential for errors in automated processing.

Although tighter regulation and a requirement for audit is seen by many commentators as the solution to improving the quality of digital reports, it remains a concern for the L compatibility of digital reporting if even simple intentions such as making the balance sheet balance are not achieved in every filing.

On the other hand, the automated processing that digital filing affords can be used to improve the quality of reporting if applied by regulators:

> We [fiscal regulator] discovered that a very high proportion of the balance sheets in accounts didn't balance...And that had been true for years and years and years that, if you just get paper accounts you don't necessarily check for that and so one thing that has happened is that [digital reporting] has improved the quality of accounting because things like balance sheets balancing, you can check that [instantly]... (European fiscal regulator, interviewed 2015)

The tensions outlined in this section suggest a lack of fluency with the language of digital reporting that undermines even regulated attempts to provide digital reports that achieve the basic aim of digital locution to express the intention of the speaker. For many smaller companies that are not in the public eye, the effect may be to improve reporting as it becomes possible to automatically screen for errors. The irony is that there are likely to be few users of these accounts.

6.2.2 User conversion

Once the tagged data are made available on the internet, they are not themselves easily interpretable by a human receiver (as per Figure 1). It is necessary to impose a 'processor' to convert them into human readable form. The processor is a computer application that fulfils the receiver's request for data by searching for the relevant tags by reference to the taxonomy.

The atomisation of the data is likely to have a significant impact on the L compatibility of the communication. Preparers of accounting reports generally consider them to be narratives that, taken as a whole, communicate the performance, position and management strategy of the

[6] For this and other examples see https://xbrl.us/guidance/roll-forward-calculations-components/.

entity (Louwers *et al.*, 1996; Stanton and Stanton, 2002). Even though the preparer translates the whole report into digital format, the receiver may extract items of data from that context without ever seeing or being aware of the whole report. The 'lifting out' (Lash, 2001; Lowe, 2004) of the digital data from its narrative reduces L compatibility, and so the potential for the accounts to have illocutionary effects.

An example of a concern in this context is that automated analysis may compare numbers of apparently the same accounting concepts but whose measurement and importance vary with the circumstances of the entity (Locke *et al.*, 2015; Valentinetti and Rea, 2012). Similarly, an interviewee observed that:

> … if there are two exact same things and there is no tag for it … it's not comparable by a computer so that is an issue. Someone must have some way to tie that into other elements [for example] whether it is a current asset because it calculates current assets then for both parties and the computer would say 'well whatever that unusual thing is it's a current asset'. (Senior executive in a large international financial services company based in the US, interviewed in 2015)

The lack of appropriate tags that are terms in the lexicon of digital reporting undermines the claimed benefits of automated comparison for users. Simply put, rather than everyone speaking the same (digital) language of accounting, the user is once again in a situation where different terms may be used for the same data item. Without even an audit of the tags this is a significant concern when digitisation encourages users to extract data items out of the full report, so there is no context for interpreting data items that are the same but have different tags.

Indeed, even those closely involved in developing taxonomies argue that there are situations in which the user should read disclosures in context to understand them:

> … the thing is data is data and a lot of accounting is contextual. I can give you a number but if I said this is the amount we are being sued for in relation to something, it's the story about the law suit that I need, so giving me a data-point is.....just data. (Senior standard-setter, IFRS, interview 2015)

What is not clear in a digital environment is how a user will discern which atomised elements need to be considered in what part of the context. Roth (2009, np) asserts that, '(t)he era of sunlight has to give way to the era of pixelization; only when we give everyone the tools to see each point of data will the picture become clear'. Our research suggests that this view is overly simplistic and that expectations that users will be empowered to extract more understanding from digital reporting than their analogue equivalents overlooks issues that are common in translation, such as finding the right term to express an equivalent idea and the need to interpret concepts in context (Kettunen, 2017).

This atomisation of the data was a source of great concern for companies filing with regulators, particularly the SEC and UK HMRC.

> Observers did say they've seen numerous companies tinkering with their XBRL tags, trying to get their filings to look a certain way when viewed through the rendering software on the SEC's Website. [The SEC] urged

> filers not to worry about appearance, since different software tools will have their own presentations of the filing anyway. (Aguilar, 2009, p. 1)

Control over the rendering of the report or part thereof is afforded to the user by the technology (Lowe *et al.*, 2012). This means that the preparer cannot choose the ordering (placing information earlier or later in the report), nor do they have the option to embed a data item in the context of particular text or other data items.

In the United Kingdom the pushback from companies filing to the tax authority (HMRC) was so strong that a hybrid system was developed that allowed users to extract tagged data but presented it in an HTML page so that the preparer of the report could control, at least in that rendering of the report, the order and positioning of the elements (Troshani *et al.*, 2015). This version of digital reporting is now being adopted by regulators worldwide (Dreyer, 2017; XBRL International Inc., 2016). Research to understand the language drivers of the rapid uptake of this alternative to 'pure' digital reporting could shed light on how preparers understand the construction of the texts that they are compiling for user consumption.

7. Discussion

The overarching proposition in the framework presented in Figure 5 is that the 'locution', the account intended by the speaker, is translated out of a simple electronic form of text (say PDF) into 'digital' data by the speaker/preparer for communication to the receiver/user. A computer processor (software or application) is required to access and re-materialise the 'pixelated' data into a format for analysis or reading by the human user. The locution is designed to convey the illocutionary intent of the speaker. That is, the illocutionary act, such as declaring or asserting in the case of financial reporting, may or may not be understood by the hearer. The extent to which the hearer understands the speaker's intent is termed L compatibility (Bach and Harnish, 1979). The translation of accounts into digital form distances the preparer from the digital 'text' as it is expressed in the IT grammar (such as XBRL which 'tags' the data). The distance is created by the need to have expertise in IT to understand the underlying digital grammar and to access the data that have been translated for the convenience of computer processing and can no longer be easily read by humans. The accountant and others involved in the design and production of what remains conceptually an 'analogue' report no longer control the presentation of the data that the user receives.

Arguments for the adoption of digital reporting suggest that it will improve the accessibility, transparency and accuracy of reported information and its subsequent analysis through automated processing (Cover, 2004; Gunn, 2007; Hodge *et al.*, 2004; Hoffman and Rodriguez, 2013). Proponents of digital reporting argue that the equivalence will be enhanced because the tags provide definitions and links to supporting references (e.g. the relevant accounting standard). If the tagging is done accurately and the user chooses to use the information in the tag, this means that at least something beyond the data element's label is available to improve L compatibility. However, there is early evidence suggesting that there is a technical and conceptual struggle involved in the tagging process (Boritz and No, 2008; Bovee *et al.*, 2002; Debreceny *et al.*, 2010). Our evidence confirms that the detailed process of selecting the right tag is a concern given that so many filers in the US have made fundamental mistakes. We also show that the translation of accounts using a taxonomy has unexpected effects on corporate reports where it is used as a guide to reporting requirements. Our participants, however, found it a convenient tool and are unlikely to be persuaded by the admonition of accounting standard-setters that it is not intended to be used in such a way.

A limited number of studies have used experimental methods to try to evaluate the impact of digital reporting on users' decision making using experimental methods (Arnold *et al.*, 2012; Ghani *et al.*, 2009; Hodge *et al.*, 2004; Locke *et al.*, 2015). Research on accountants found equivocal acceptance and use of tagged data (Ghani *et al.*, 2009). The authors identify the need for education to promote awareness and this early study could usefully be replicated now that international adoption has increased. Arnold *et al.* (2012) and Locke *et al.* (2015) report the findings of experiments using non-professional investors. Arnold *et al.* (2012) find that 'the tagged format facilitates the incorporation of risk information into investors' decision processes' whereas there was no evidence of improved decision making in the Locke *et al.* (2015) study, although participants preferred its ease of use. These studies focus on the recipient of the report, the choice they make about the sources of information to use, their preferences and whether or not they are better able to better identify and use relevant information when it is available in digital format. Results are mixed and there is a lack of conclusive evidence about what the mediating effect of digital data is on the perlocutionary acts of users.

An example of an issue that affects both L compatibility and taxonomy development is the tendency of preparers of reports to use slightly different labels in disclosures. One taxonomy developer and standard-setter explained:

> I was given access to some data …. and my recollection is there are 112 different letter combinations that describe cash at bank because it's 'Cash', 'cash, at bank', 'cash (at bank)', 'cash and cash equivalent'. Because they are just commas or dashes or things, they're all slightly different … [but] they should all be tagged as being 'cash and cash equivalents'.

Digital tagging is argued to improve the quality of reporting by tagging all of the concepts that may be labelled differently in reports using the same tag. This is essential for automated cross-company comparison, but it assumes that in all the cases where a single tag is chosen to represent concepts expressed slightly differently by report preparers that the difference was not intentional so as to communicate something to users. This avenue for nuance is erased by the digital tags. Research into the word choices of preparers and the effect on the L compatibility of reports of their elimination by digital translation may reveal that indeed the standardization imposed by the taxonomy improves communication, or alternatively, that something is lost.

This discussion so far has ignored what is considered a significant issue in some parts of the accounting literature; that is, whether or not the communication is 'right' or 'correct' or provides 'greater transparency'. As Macintosh and Baker (2002) argue, whether or not we see these as important questions for accounting communication depends on our perspective on language. Is it possible to have 'real-world referents' for concepts such as earnings or goodwill or deferred taxation such that every trained person would be able to reach the same judgment about the data element's veracity? Certainly, proponents of digital reporting claim that it will improve accuracy and transparency in financial reports (Berkeley *et al.*, 2002; Moyer, 2008). It is important to be clear what is being claimed and what type of system is required to achieve the claims (Weisel, 2002). For example, an increase in accuracy may be cited where tagging is used internally to connect disparate systems and create 'straight-through' reporting. If well designed, such a system may reduce the possible errors created by attempting to combine data for reporting through a series of spreadsheets or other essentially manual processes. On the other hand, the responsibility for the translation of the accounts

directly into digital data is ceded to an automated system. This presupposes that 'facts are facts' and reduces the opportunities for context to be added to improve communication. Our respondents were clear that there are limits to the usefulness of isolated data points. The implication is that relying on automation to improve 'accuracy' may reduce L compatibility.

Evans *et al.* (2015) discuss approaches to the complex translations involved in the transnational, multidisciplinary setting of the technical concepts (jargon) of accounting. They relate experience in translation from other disciplines, including law, marketing and medicine. They observe that '… the relatively standardized language of science and technology makes computer-based translation more feasible than in more culture-dependent domains' (p. 15). The taxonomy is affording a computer-based translation that appears to be an automated solution to digital reporting and accounting communication between countries with different languages since digital tags are provided for 14 national languages (IFRS Foundation, 2017). However, while the difficulties of translating between English and the national languages of countries adopting IFRS have been researched (Kettunen, 2017), the need for effective communication between the accounting and IT disciplines and the effects on the 'equivalence' of concepts is largely unexplored because of the lack of individuals with the necessary combined expertise to span the two epistemic cultures (Knorr Cetina, 1999). We do not fully understand what effect the 'computer guys' have on the framing of the concepts in the taxonomy. As digital taxonomies become part of the 'black boxed' infrastructure (Hanseth and Monteiro, 1997; Latour, 1987; Lowe, 1997) of accounting it may be that not only does reporting practice affect the taxonomies, but the taxonomies affect reporting in the nuances gained or lost in the definition and syntax of the concepts. The framework in Figure 5 reflects this in the bidirectional arrows between the translation of reports (in the top half of the diagram) and the taxonomies and the action of the processing technology and the taxonomy.

We do know that the introduction of the translation between accounting standards and digital grammars for tagging reports has impacted the standards. Both standard-setters and taxonomy developers agree that the different perspectives they bring to the task of developing high quality accounting standards improve their clarity and consistency. So while the effect remains unclear in the regular application of the taxonomy in practice, within the process of standard-setting digital translation is a 'primary activity' rather than a 'marginal' one (Bassnett and Trivedi, 1999).

8. Conclusion and future research

Just as 'translation is crucial to a process of globalization' (Evans *et al.*, 2015, p. 2), translation is implicated in often opaque ways in the digitisation of corporate reporting. This paper reports an analysis of the process and infrastructure for translating digital corporate reports using Searle and Austin's illocutionary theory. The outcome is a framework which may be used to identify research approaches and important issues for future research in the sites of translation and the overarching achievement of L compatibility.

Two sites of translation are identified, one in the machine translation and interpretation of the taxonomy in the regular reporting undertaken by organisations, and the other in the translation of accounting knowledge in taxonomies that provide the syntax and semantic meta-data for creating accessible, atomised data. A key point is that like any inter-lingual translation, the production of reports that computers recognise and 'understand' involves

translations which have significant potential to change, not just how business information is communicated, but what is communicated. Further, digital reporting translation has already started shaping accounting standards and GAAP.

We have provided interview, documentary and literature evidence to develop the framework in Figure 5. As the adoption of digital reporting grows internationally, there is a substantial empirical field of research in which case study, interview, observational, and archival methods as well as 'big data' analysis can contribute to our understanding of this emerging issue for accounting and corporate reporting.

The translation framing also permits a critical perspective on digital reporting to be adopted. For hundreds of years 'accounts' were shaped, developed and institutionalised on the basis that they would be presented as pages with a particular order and that the juxtaposition of what was presented would contribute to the communication of the meaning intended by accounting standard-setters, regulators and preparers of the reports. This analogue report design, or 'paper paradigm', is now being challenged by a technological disruption that has been 16 years in the making.

The nature of the texts that constitute the accounting world are being redesigned and redefined. Rather than insisting that the traditional approaches to reporting and standard-setting are the primary text to be protected and preserved in the translation to the digital language, there is an opportunity to see that the '(t)ranslation … is a dialogue, the translator is an all-powerful reader and a free agent as a writer' (Bassnett and Trivedi, 1999, p. 5). The survival of the tagging technology is intertwined with the success of the translated reports – so in a real sense the 'health and nourishment of the translator' (Bassnett and Trivedi, 1999, p. 5) is at stake. Some research has applied a critical perspective of the digital reporting project, but not from a linguistic perspective (Lowe *et al.*, 2012). Linguistic theories are ideally placed to study and expose the shifts in power as meaning is contested in taxonomies and digital reporting. In addition, the sites of translation identified using the framework of L compatibility developed in this paper provide important insights into the emerging field of digital reporting. Some suggested topics for future research are outlined in Table 2.

Table 2 Overview of research topics identified by site of translation

Site of translation	Indicative research topics
Taxonomy translation	*Translating accounting into digital taxonomies:* • Institutional issues in the production, versioning and maintenance of taxonomies • Historical narrative analysis of the production of taxonomies, political pressures and control over the meaning of accounting concepts • Taxonomies in different grammars – implications for reporting • Taxonomies as lexicons of jargon; definitions, completeness and usability • IT expertise – professional boundary issues and language • Digital reporting and the automated inter-lingual translation of reports *Taxonomies and reflexive translation:* • The disciplining effects of digital taxonomy grammar on accounting standard-setting • Gains and losses in accounting standard-setting in conjunction with taxonomy development; heteroglossic voices in general purpose, regulated and internal organisation reporting
Report translation	• Organisational effects of the dialogue to translate concepts into shared vocabularies for structured tagging

	• Communicative effects of 'straight through' reporting and prospects for improved communication through technology-enabled continuous reporting • The role of presentation in communication and the effect of the atomisation of data on preparers' preference for alternatives that provide control over presentation

The framework presented here emerges from considering digital reporting through the conceptual lens of translation. We found that this has provided us with an insightful structure within which to consider the implications of a significant change occurring in corporate reporting that may otherwise be disregarded as simply being a different medium.

Appendix: L compatibility terms

The linguistic theory used here is the subject of extensive debate and the definition of terms is contentious. These descriptions are provided to support a general understanding of the application of the theory in this paper and foster further development of the ideas.

Term	Description	Sources
L compatibility	If there is L compatibility, the hearer understands the intention of the speaker.	Bach & Harnish (1979, 1992); Cooren (2000); Searle (1989); Vanderveken and Kubo (2001)
Locutionary statement (act)	The content of what is said or written, expressed in a language. Note that some locutionary acts may be not intended to be understood literally, for example when a speaker is joking. The hearer must interpret from the context whether the literal meaning is what is being communicated.	
Illocutionary statement (act)	A locutionary act intended by the speaker to be understood as having force. It is intended to be performative. For example, pronouncements, promises, assertions, requests, prohibitions, and permissions.	
Perlocutionary statement (act)	A locutionary act that results in the hearer taking action, which may or may not be the action intended by the speaker.	
Felicity	A speech act may be more or less effective in expressing the thoughts of the speaker and having the desired illocutionary and perlocutionary effects. A felicitous speech act is one that is effective in achieving the aims of the speaker.	

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